

Lower Passaic River Study Area Upper 9-Mile Plan

CPG Presentation to CSTAG

March 1, 2018

Why an Interim Remedy for the Upper 9-Miles?

- Primary source material slowing recovery in the Upper 9-Miles has been identified and can be addressed now
- Accelerates reductions in Human Health & Ecological Risks and recovery of the River
- Allows coordination with Lower 8-Mile Remedy for a more efficient, faster & less impactful clean up of the entire LPRSA
- Post action monitoring would begin earlier and identification of the need for further action , if necessary, would occur sooner

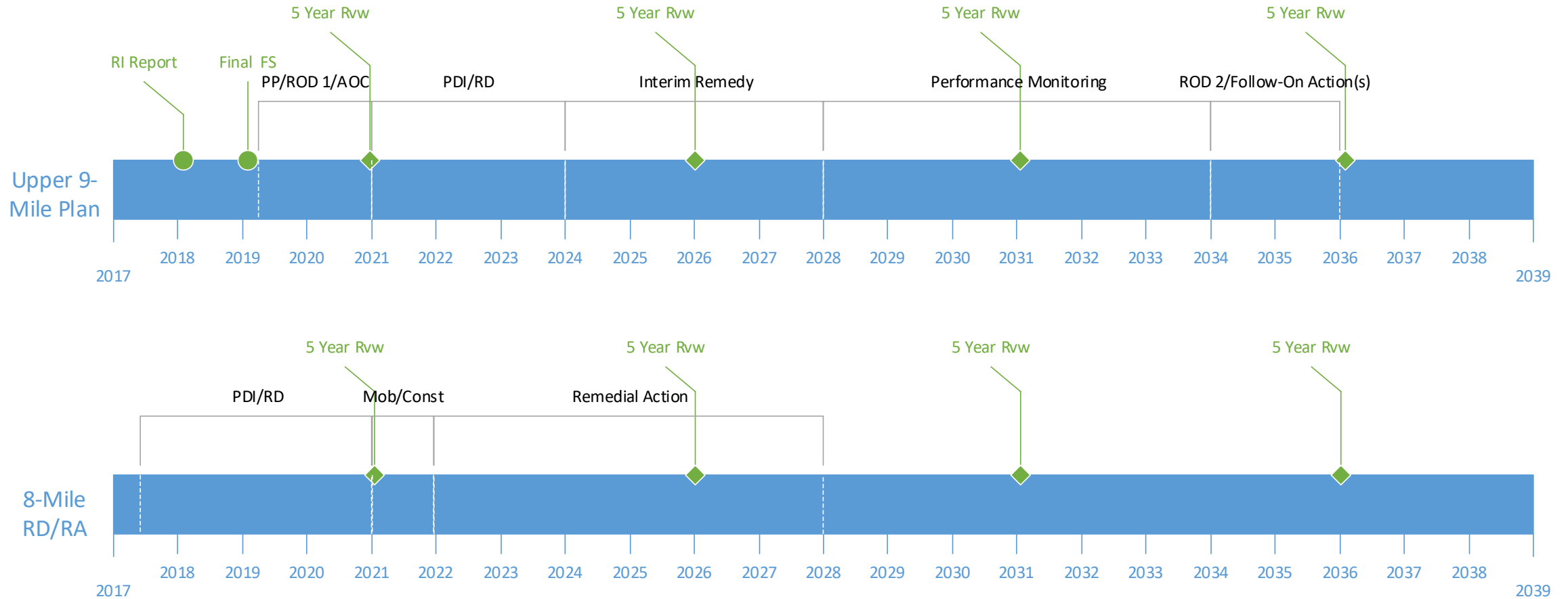
What is the Proposed Upper 9-Mile Plan?

- **Expedite Upper 9-Mile Feasibility Study – 2018 Completion**
- **Phase 1 Interim Remedy**
 - **Pre-Design Investigation (PDI)**
 - Sampling program for sediment (high density), surface water and tissue
 - Provides data to establish IR remedial footprint to meet RAOs
 - Establishes baseline for sediment, surface water & tissue
 - Provides data to refine models
 - **Remedial Design (RD)**
 - Finalize IR footprint to meet RAOs
 - Develop recovery trajectories based on refined models
 - Prepare post-IR performance monitoring program
 - **Perform Phase 1 Interim Remedy**
 - **Performance Monitoring & Remedy Evaluation**
 - Compare tissue & water column to recovery projections developed in RD
 - Determine if recovery is progressing as projected
 - Evaluate risk reduction
- **Subsequent Action – Second ROD**
 - Determine need for a final remedial action or
 - Memorialize Remedial Goals have been met (i.e., Remedy is protective)

Phase 1 Interim Remedy (IR) RAO Summary

- Control the principal sediment sources of 2,3,7,8-TCDD and Total PCBs
 - Attain a 90% reduction in the 2,3,7,8-TCDD surface weighted average concentration (SWAC) and a reduction in Total PCB SWAC to below established background.
 - RALS of 300 ng/kg of 2,3,7,8-TCDD & 1 mg/kg of Total PCBs
- Control subsurface sediment in areas that may be subject to future erosion.
- Monitor IR performance (risk reduction & recovery) with a structured monitoring program with established metrics and triggers

Upper 9-Mile Plan Coordinated with 8-Mile RD/RA Addresses 17-Miles Sooner



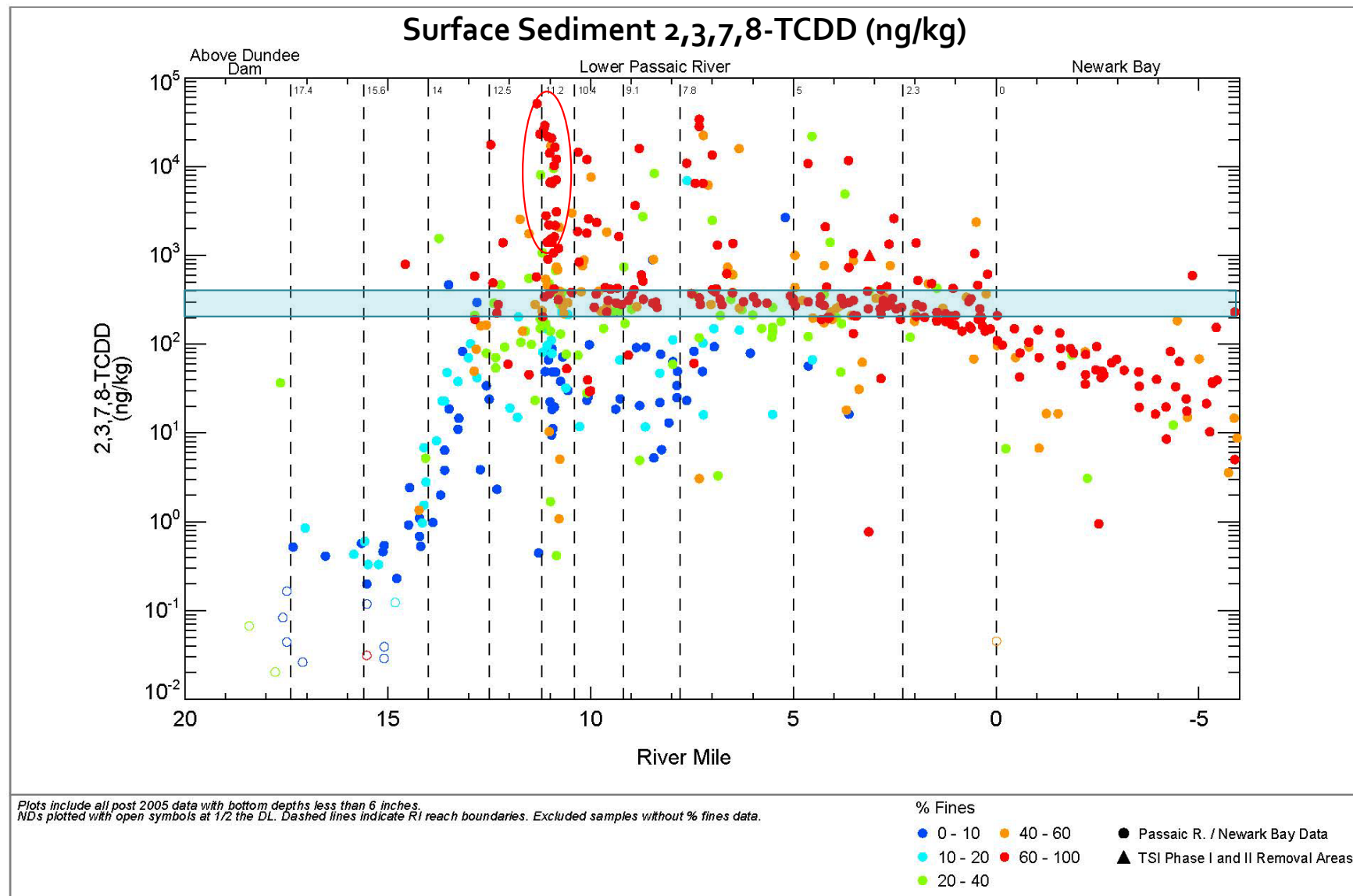
Why a 300 ng/kg 2,3,7,8-TCDD RAL?

- Delineates internal sources from sediments likely to recover if sources are addressed
- Internal sources identified as sediments significantly above 300 ng/kg
 - Exceeds water column particulate concentrations
 - Must have slow or no net deposition and may be subject to net erosion
- Sediments below 300 ng/kg are undergoing recovery

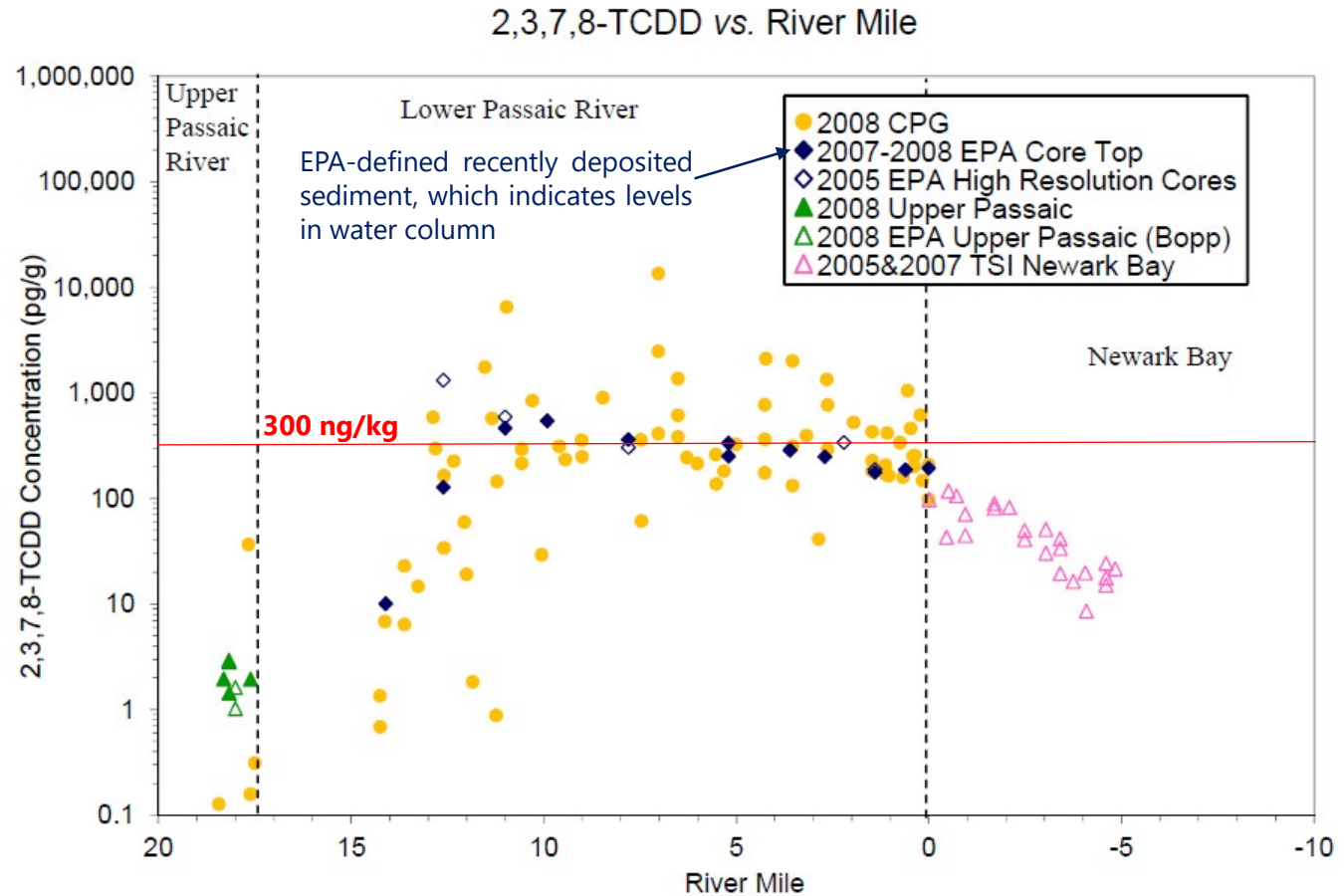
Sediments Above RM 8.3:

- 200 to 300 ng/kg roughly breaks finer and coarser sediments;

- Note cluster of finer sediments in the range of 200-400 ng/kg



Depositing
Particle 2,3,7,8-
TCDD
Concentrations
in RM 8.3 to 15
is above 300
ng/kg



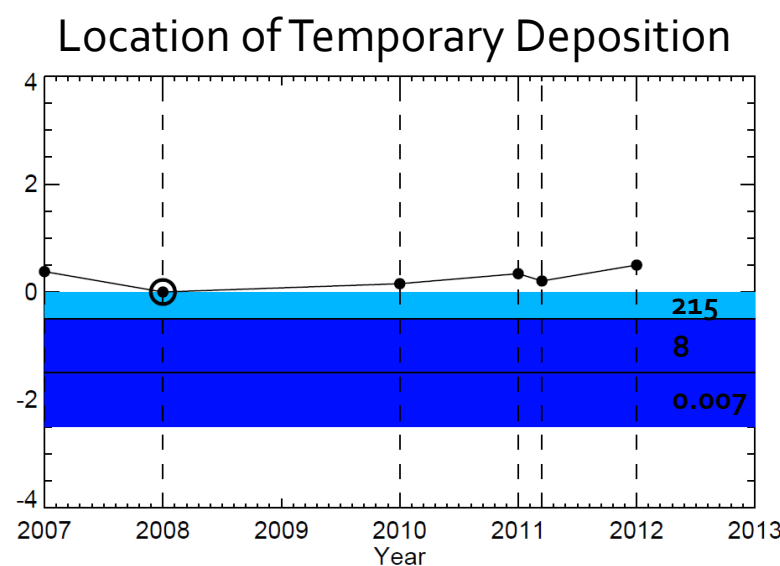
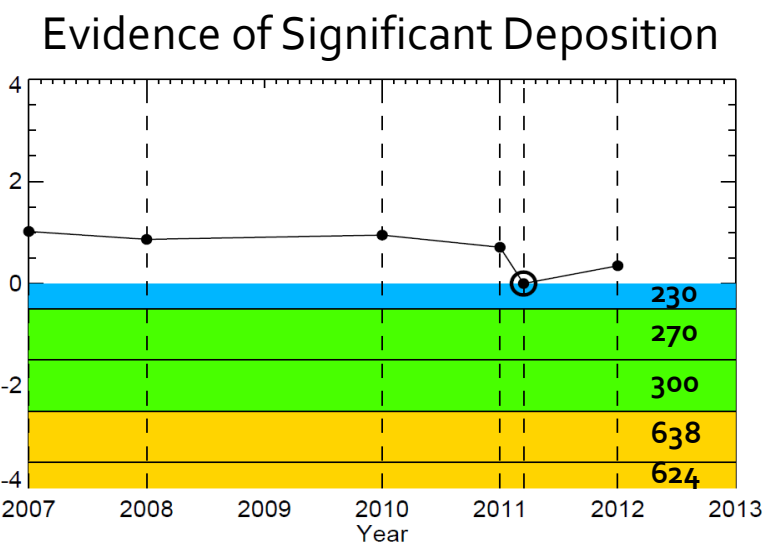
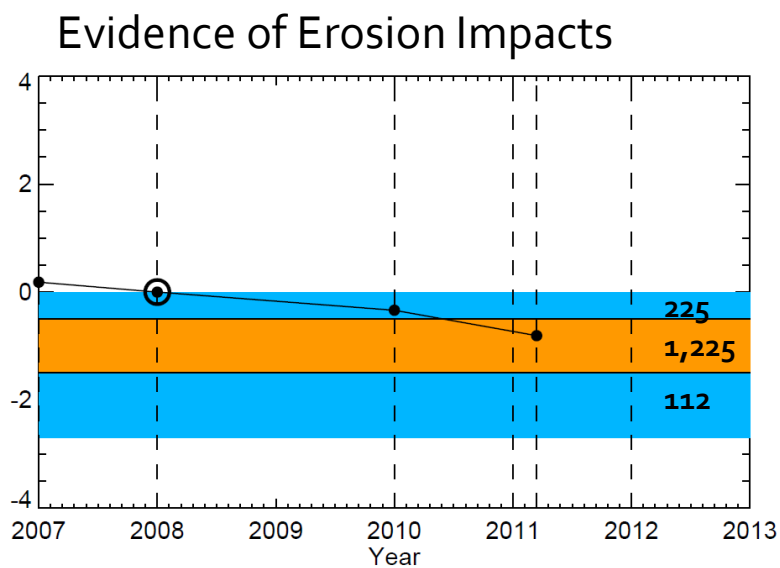
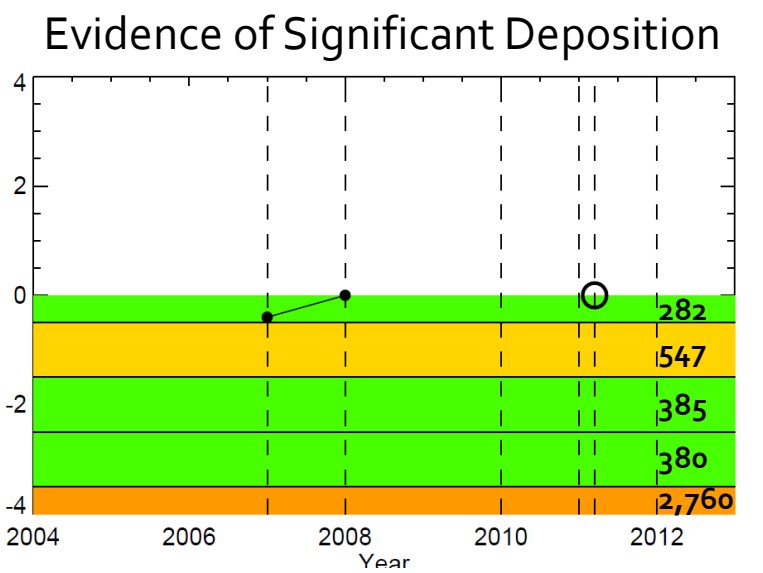
"...2,3,7,8-TCDD concentration in recently-deposited sediments vary less than a factor of 3 from RM 2 to RM 12 (note in blue diamonds on the upper diagram in Figure 4-3)." – FFS RI Report at Page 4-3.

Water Column 2,3,7,8-TCDD Particulate
Concentrations at RM 10.2 (from HV-CWCM)
180 & 340 ng/kg

Locations with 2,3,7,8-TCDD of 200 ng/kg to 300 ng/kg Mostly Show Recovery Potential

12 such cores RM 8 and RM 12.5

- 10 show recovery potential
- 7 have multiple layers in the 200 to 400 ng/kg range
- 2 have higher concentrations below the surface layer but no significant erosion despite high flow events
- 1 has no subsurface contamination – temporary deposition
- 2 show erosion impacts



2,3,7,8-TCDD Conc. (ng/kg)

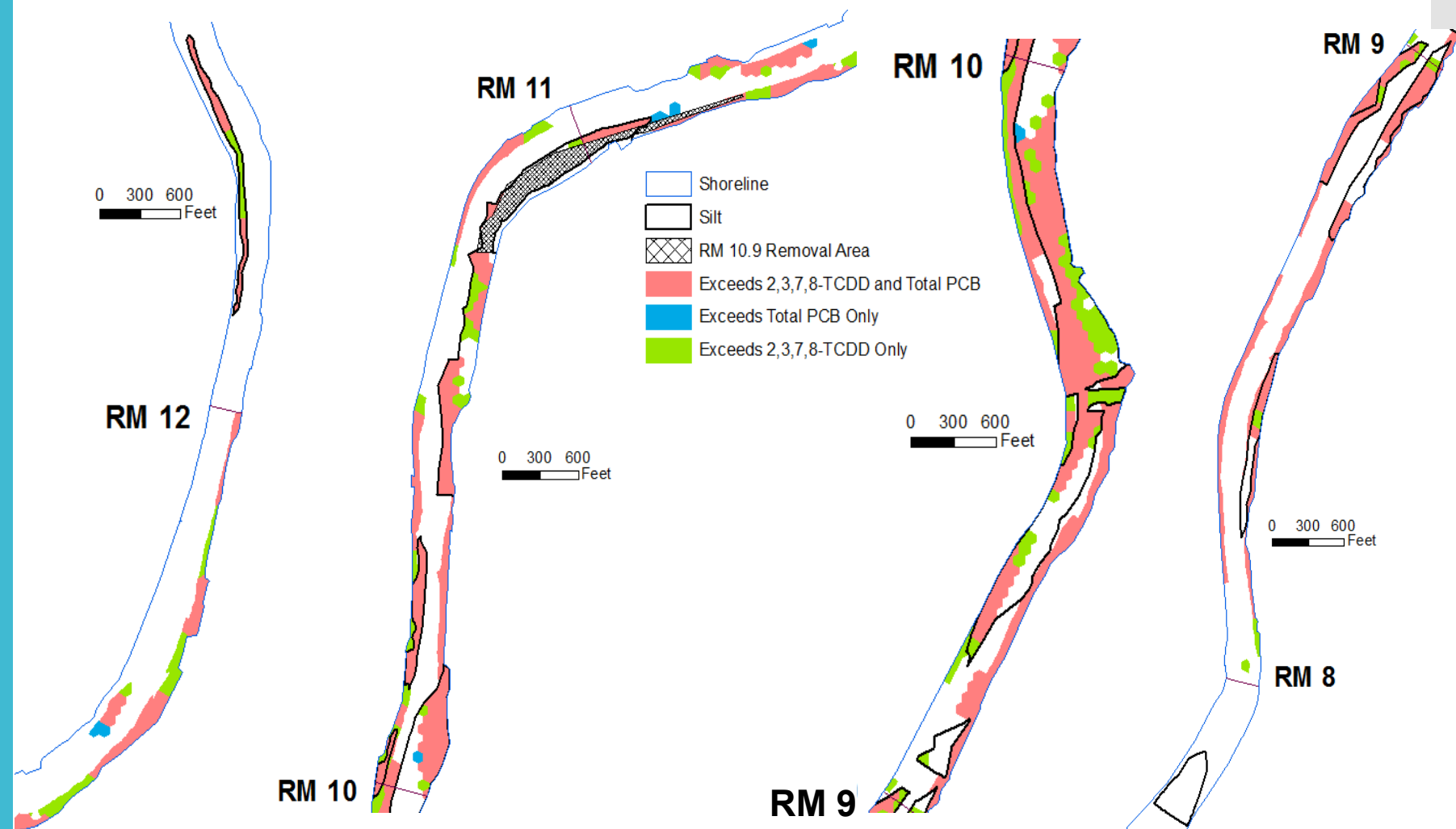
0 - 100	500 - 1000	○ Indicates core sampling year
100 - 250	1000 - 10000	● Mudline Elevation
250 - 500	10000 - 1588250	

Example Areas Targeted Using CS37

(area above RM 12.5 not shown for convenience)

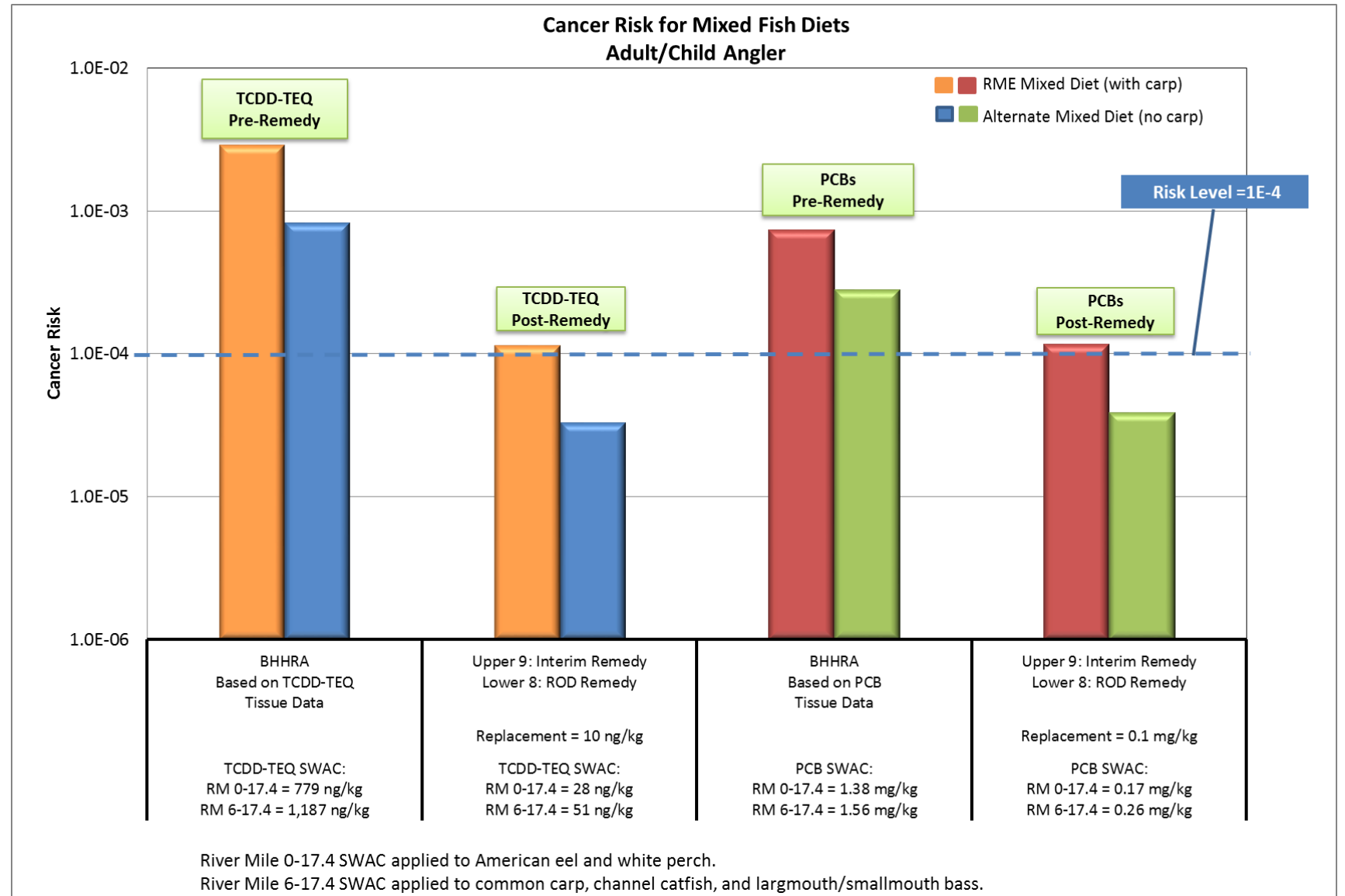
Between 69 and 94 acres \geq RALs when examining all 100 CS maps

Achieves > 90% reduction in TCDD SWAC between RM 8 and RM 15

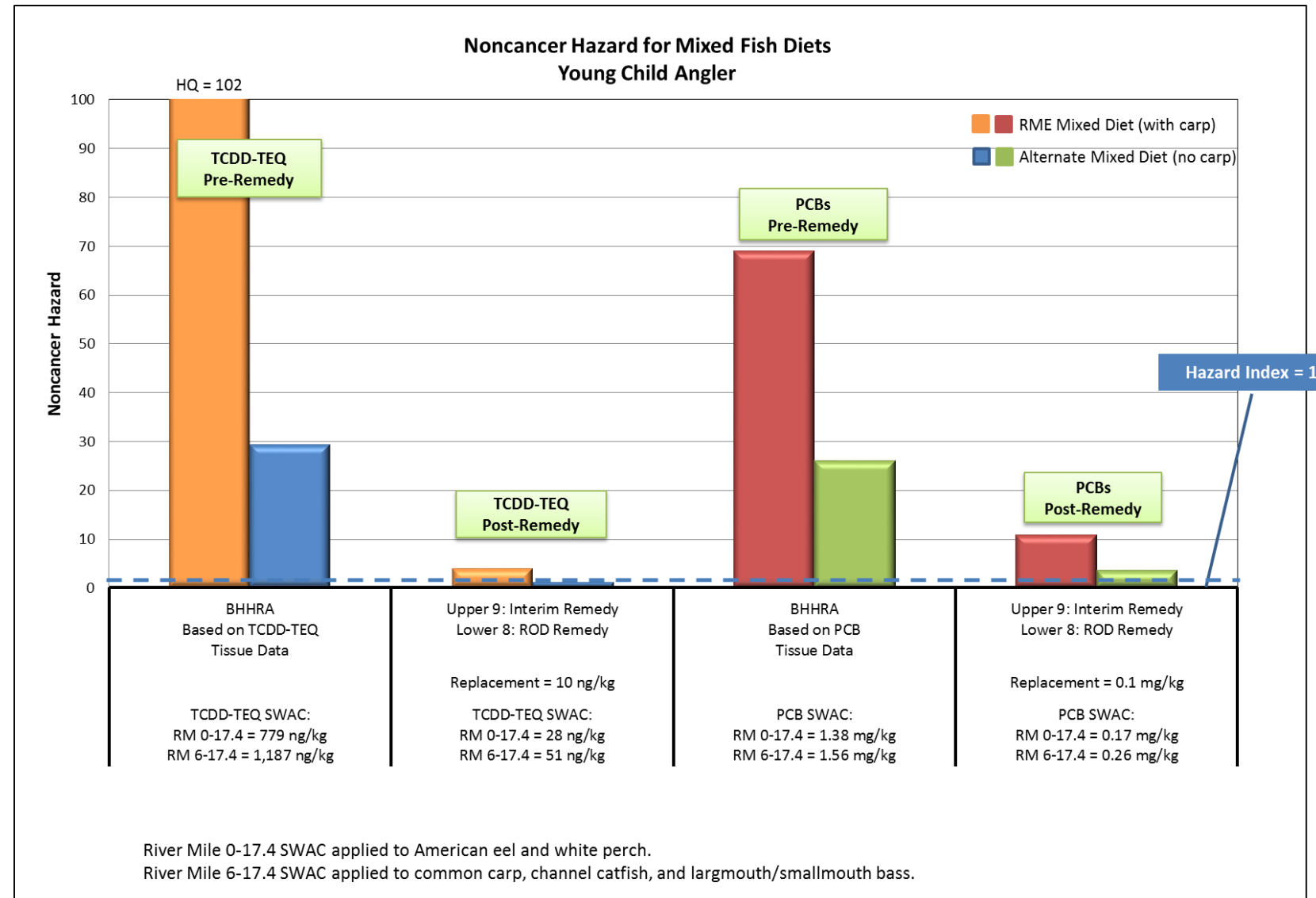


RM 8 = RM 8.3 in the RM system adopted for the FFS

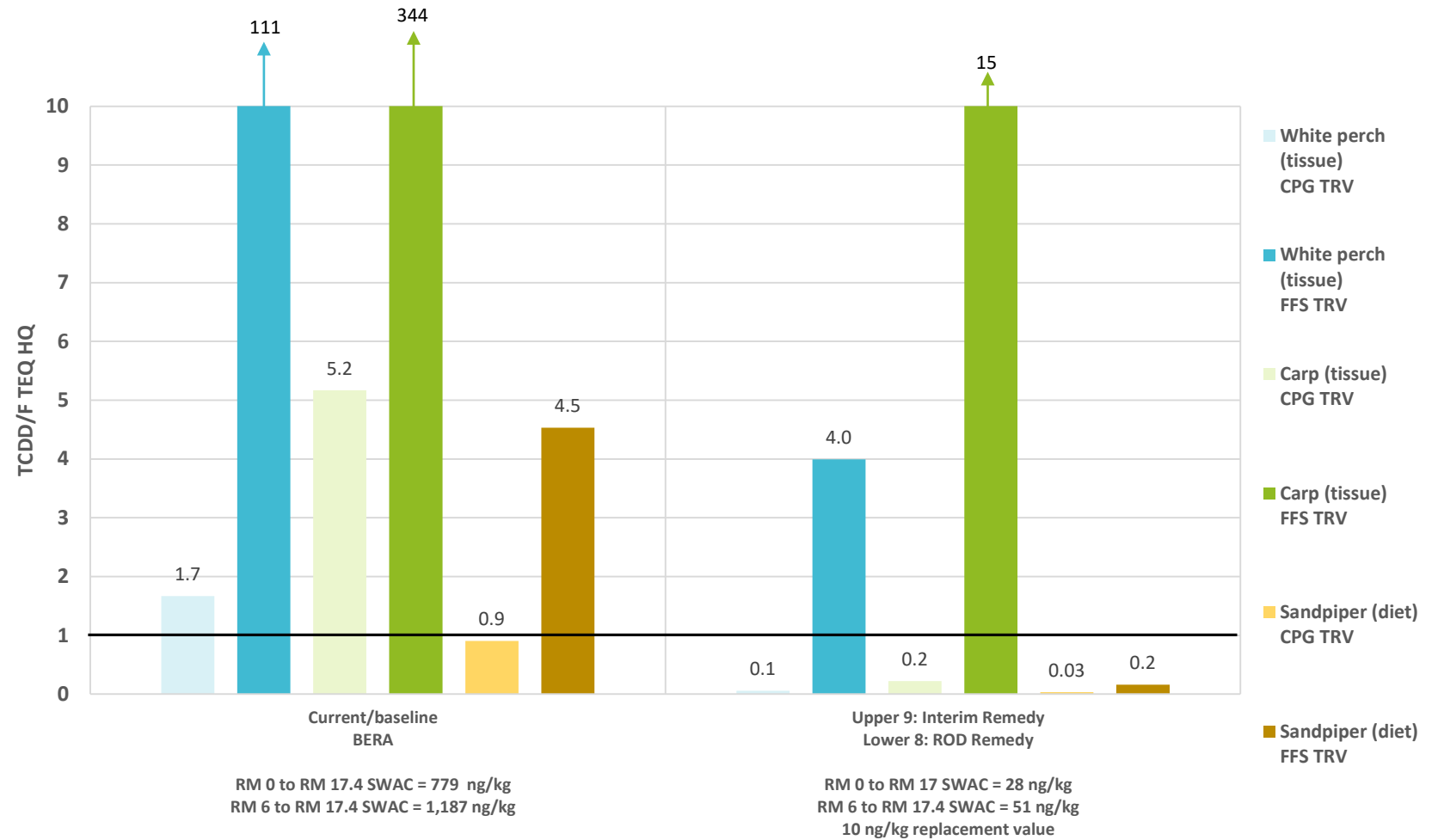
Potential Reductions in Human Health Risk from the Phase 1 IR – Cancer



Potential Reductions in Human Health Risk from the Phase 1 IR - Noncancer

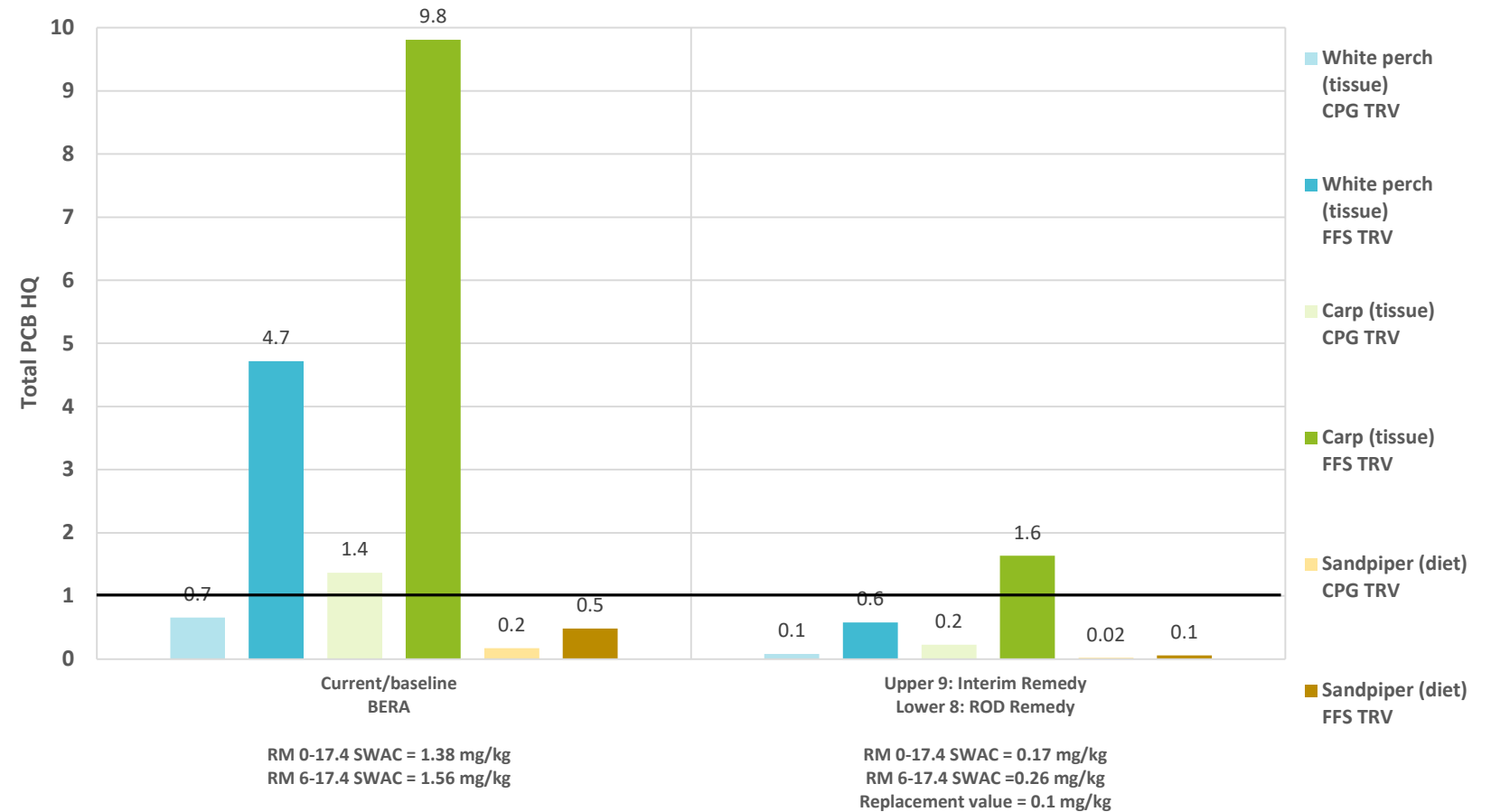


Potential Reductions in Ecological Risk from the Phase 1 IR – TCDD/F TEQ HQ



RM 0-17.4 SWAC applied to white perch and sandpiper
 RM 6-17.4 SWAC applied to carp

Potential Reductions in Ecological Risk from the Phase 1 IR – Total PCB HQ



RM 0-17.4 SWAC applied to white perch and sandpiper
 RM 6-17.4 SWAC applied to carp

Upper 9-Mile Plan Adaptive Management Process

- Remedial Design
- Perform baseline monitoring
 - Investigate uncertainties
 - Develop recovery projections using refined models
 - Set triggers

Interim
Remedy
Implementation

Long-term
Performance
Monitoring

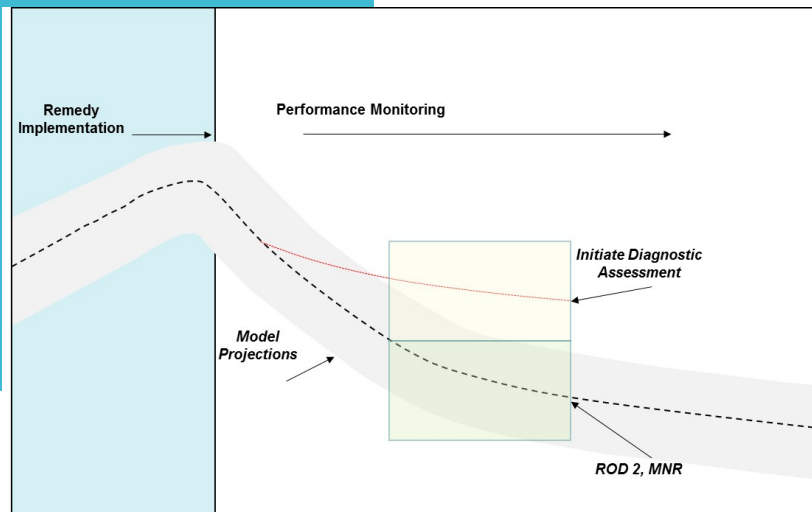
Recovery
progressing
within
expected
range?

Yes

- MNR final remedy
- Final cleanup goals
- Final ROD

No

- Diagnostic assessment
- Additional monitoring to reduce uncertainty
- Evaluate/ implement additional actions
- Second ROD



Adaptive Management - Preliminary Metrics, Triggers, and Responses

Remedy Objective/ Performance Standard	Primary Monitoring Metrics	Potential Triggers	Possible Response Actions
Reduce tissue concentrations in fish and crab	<ul style="list-style-type: none"> Baseline and long-term tissue monitoring 	<ul style="list-style-type: none"> Tissue recovery rates are slower than the projected range Tissue concentrations reach a plateau that will not achieve adequate risk reduction 	<ul style="list-style-type: none"> Confirmatory tissue sampling Diagnostic sediment and water column monitoring Source investigation CFT/FWM model recalibration Evaluation/selection of additional source control or in-water actions
Reduce COC concentrations on water column solids depositing in the upper 9 miles	<ul style="list-style-type: none"> Baseline and long-term water column monitoring 	<ul style="list-style-type: none"> Water column solids COC concentration recoveries are less than the projected range 	<ul style="list-style-type: none"> Focused water column monitoring to identify areas of concern HST/CFT model recalibration Evaluation/selection of additional source control or in-water actions
Prevent re-exposure of subsurface sediment with COC concentrations >> RALs in uncapped areas	<ul style="list-style-type: none"> Baseline and post-construction bathymetry Future bathymetric surveys in response to high-flow events 	<ul style="list-style-type: none"> Bathymetry data indicate erosion and re-exposure of buried contamination 	<ul style="list-style-type: none"> Sediment sampling in potentially eroded/exposed areas Evaluation/selection of additional actions

Upper 9-Mile Plan Will Reduce Risk Earlier & Promote Recovery

- Certain:
 - Phase 1 IR designed to reduce contaminant levels by at least 90% for TCDD and Total PCBs to below background
 - Human Health & Ecological risks significantly & quickly reduced
 - Recovery will be accelerated
- Expected:
 - Risk reduced to EPA's acceptable risk range in 20 or so years
- Certain:
 - Post remediation monitoring will provide data needed to confirm recovery
 - If additional remediation is needed more will be done



Supplemental Slides

Key Issues

Immediate feedback (Mid-March) to initiate Draft FS:

1. EPA's Direction Letter to Refocus FS to develop an Interim Remedy for the Upper 9-Miles
2. RAOs
3. Remedial Alternatives

FS Schedule Goals:

1. Draft FS in 3rd Quarter
2. Final FS – 12/18

Proposed Remedial Action Objectives for Phase 1 IR Provide Performance Certainty

RAO 1 - Control the principal sediment sources of 2,3,7,8-TCDD and Total PCBs, thereby attaining a 90% reduction in the 2,3,7,8-TCDD surface weighted average concentration (SWAC) and a reduction in Total PCB SWAC to below established background. Source areas are identified as those areas where sediment concentrations in the top six (6") inches exceed remedial action levels (RALs) between RM 8.3 and RM 15. To the extent that controlling these source areas do not attain the SWAC reduction targets, additional areas will be remediated to achieve the target SWAC reductions.

RAO 2 - Control the potential exposure of additional subsurface sources of 2,3,7,8-TCDD and Total PCBs by remediating surface sediments between RM 8.3 and RM 15 with a demonstrated potential for net erosion and shallow subsurface sediment concentrations (6-18 inches below the surface) that exceed the RALs.

RAO 3 - Following implementation of the IR, monitor to confirm that post-remedial recovery is progressing towards achieving expectations for tissue concentrations and apply adaptive management to identify additional response actions, if needed to achieve acceptable risk

Proposed Phase 1 IR Remedial Alternatives

1. No Action RM 8.3 to RM 17.4
 - Monitoring to evaluate recovery between RM 8.3 and RM 17.4
2. Targeted capping with dredging for flood control, RM 8.3 to RM 15, 1.5-ft dredge depth
 - Footprint basis: Identified sediment source areas between RM 8.3 and RM 15, consisting of surface sediment with concentrations exceeding RALs and subsurface sediment with concentrations exceeding RALs in potential erosional areas
 - Engineered cap with reactive layer, dredge depth = 1.5 ft
3. Targeted capping with dredging for flood control, RM 8.3 to RM 15, 2.5-ft dredge depth
 - Footprint basis: Identified sediment source areas between RM 8.3 and RM 15, consisting of surface sediment with concentrations exceeding RALs and subsurface sediment with concentrations exceeding RALs in potential erosional areas
 - Conventional cap, dredge depth = 2.5 ft

Locations with
100-200 ng/kg of
2,3,7,8-TCDD in
Coarser
Sediments
Exhibit Carbon-
Based
Concentrations
Suggesting Close
Connection to
Water Column
Particulates

- 13 Locations with surface concentrations between 100 and 200 ng/kg
- Coarser sediments w 10-40% fines
- Carbon-based concentrations average 6,000 ng/kg OC
 - range from 2,000 to 12,000 ng/kg OC
- Water column carbon-based concentrations average 3,000 ng/kg OC
 - range from 400 to 30,000 ng/kg OC